In the Claims:

1.   (Currently amended): A computer-implemented method for modeling a data set comprising:

selecting an initial set of hyperparameters for determining a prior distribution for the data set for modeling thereof, the prior distribution approximated by a product of a distribution of the set of hyperparameters, a distribution of a set of weights, and a distribution of a set of predetermined additional parameters; and,

interactively updating the distribution of the set of weights, the distribution of the set of hyperparameters, and the distribution of the set of predetermined additional parameters until a predetermined convergence criterion has been reached,

such that the product of the distribution of the set of hyperparameters, the distribution of the set of weights, and the distribution of the set of predetermined additional parameters as have been iteratively updated approximates the posterior distribution for modeling of the data set for probabilistic prediction.; and,

outputting at least the product approximating the posterior distribution for modeling of the data set.

2.   (Original): The method of claim 1, further comprising initially inputting the data set to be modeled.

3.   (Canceled.)

4.   (Original): The method of claim 1, wherein the data set comprises

a continuous data set, such that the set of predetermined additional parameters

comprises a set of parameters accounting for noise.

5.   (Original): The method of claim 1, wherein the data set comprises

a discrete data set, such that the set of predetermined additional parameters

comprises a set of parameters accounting for a lower bound.

6.   (Previously presented): A computer-implemented method

comprising:

inputting a data set to be modeled;

determining a relevance vector learning machine via a variational

approach to obtain a posterior distribution for the data set; and,

outputting at least the posterior distribution for the data set for probabilistic

prediction.

7.   (Original): The method of claim 6, wherein determining the

relevance vector learning machine comprises:

selecting an initial set of hyperparameters for determining the prior

distribution for the data set, the prior distribution approximated by a product of a

distribution of the set of hyperparameters, a distribution of a set of weights, and a distribution of a set of predetermined additional parameters; and,

interactively updating the distribution of the set of weights, the distribution of the set of hyperparameters, and the distribution of the set of predetermined additional parameters until a predetermined convergence criterion has been reached.

8.   (Original): The method of claim 6, wherein the data set comprises a discrete data set, such that the set of predetermined additional parameters comprises a set of parameters accounting for a lower bound.

9.   (Original): The method of claim 6, wherein the data set comprises a continuous data set, such that the set of predetermined additional parameters comprises a set of parameters accounting for noise.

10.   (Currently amended): A machine-readable medium having instructions stored thereon for execution by a processor to perform a method for modeling a continuous data set comprising:

selecting an initial set of hyperparameters for determining a prior distribution for the continuous data set for modeling thereof, the prior distribution approximated by a product of a distribution of the set of hyperparameters, a distribution of a set of weights, and a distribution of a set of parameters accounting for noise; and,

interactively updating the distribution of the set of weights, the distribution

of the set of hyperparameters, and the distribution of the set of parameters

accounting for noise until a predetermined convergence criterion has been

reached,

such that the product of the distribution of the set of hyperparameters, the

distribution of the set of weights, and the distribution of the set of parameters

accounting for noise as have been iteratively updated approximates the posterior

distribution for modeling of the continuous data set for probabilistic prediction-;

and,

outputting at least the product approximating the posterior distribution for

modeling of the continuous data set.

11.   (Original): The medium of claim 10, wherein the method further

comprises initially inputting the continuous data set to be modeled.

12.   (Canceled.)

13.   (Currently amended): A machine-readable medium having

instructions stored thereon for execution by a processor to perform a method for

modeling a discrete data set comprising:

selecting an initial set of hyperparameters for determining a prior

distribution for the discrete data set for modeling thereof, the prior distribution

approximated by a product of a distribution of the set of hyperparameters, a distribution of a set of weights, and a distribution of a set of parameters accounting for a lower bound; ~~and~~,

interactively updating the distribution of the set of weights, the distribution of the set of hyperparameters, and the distribution of the set of parameters accounting for a lower bound until a predetermined convergence criterion has been reached,

such that the product of the distribution of the set of hyperparameters, the distribution of the set of weights, and the distribution of the set of parameters accounting for a lower bound as have been iteratively updated approximates the posterior distribution for modeling of the discrete data set for probabilistic prediction~~-~~; and,

<u>outputting at least the product approximating the posterior distribution for modeling of the discrete data set.</u>

14. (Previously presented): The medium of claim 13, wherein the method further comprises initially inputting the discrete data set to be modeled.

15. (Canceled.)

16. (Previously presented): A machine-readable medium having instructions stored thereon for execution by a processor to perform a method comprising:

inputting a data set to be modeled;

determining a relevance vector learning machine via a variational

approach to obtain a posterior distribution for the data set for probabilistic

prediction; and,

outputting at least the posterior distribution for the data set.

17.   (Original): The medium of claim 16, wherein determining the

relevance vector learning machine comprises:

selecting an initial set of hyperparameters for determining the prior

distribution for the data set, the prior distribution approximated by a product of a

distribution of the set of hyperparameters, a distribution of a set of weights, and a

distribution of a set of predetermined additional parameters; and,

interactively updating the distribution of the set of weights, the distribution

of the set of hyperparameters, and the distribution of the set of predetermined

additional parameters until a predetermined convergence criterion has been

reached.

18.   (Original): The medium of claim 16, wherein the data set

comprises a discrete data set, such that the set of predetermine additional

parameters comprises a set of parameters accounting for a lower bound.

19.   (Original): The medium of claim 16, wherein the data set

comprises a continuous data set, such that the set of predetermined additional

parameters comprises a set of parameters accounting for noise.